

REMARKS/ARGUMENTS

Favorable reconsideration of this application is respectfully requested.

Claims 3, 23 and 28 are present in this application, claims 1, 4-7, 20-22, 24-27 and 29-33 being canceled by way of the present amendment. Claims 3, 23 and 28 are rewritten in independent form.

The Applicants gratefully appreciate the interview between their representative and Examiner Lee on February 2, 2010. During the interview the Applicants' representative explained how the Yamauchi reference (JP 2002-226926) cannot produce particles of the size as recited in the pending claims, and the addition of the teachings of Tsumura (US 2002/0015878) does not remedy the deficiencies. It would not be possible to reduce the particle size in Yamauchi according to the sizes in the claims, since it is simply not possible to create particles of the recited size using the methods taught by Yamauchi. No agreement was reached on this issue.

Also discussed was the comments on page 7 of the Office Action regarding how Ito (U.S. 4,794,054) would enable making the catalyst particles of Yamauchi of the size in the pending claims because it uses a method as described in the present specification. However, as explained above, Yamauchi cannot produce the particle sizes since it uses a different method which does not produce particles of the claimed size.

Examiner Lee explained her position how the Ito reference (U.S. 4,794,054) was used to demonstrate enablement of the particle sizes. The rejection should not be viewed as a combination of references, but the Office Action establishes that the particles of appropriate composition can be fabricated by Yamauchi and the other references (Ito and Tsumura) provide evidence that particles of smaller size can be made.

Also discussed was "platinum-containing nitride particles including a platinum nitride-based nano-material." The Examiner pointed out that, in her view, "nano-sized"

simply means that the material can be measured in nanometers. In other words, a material of 1000 nm size is a nano-sized material. Secondly, Examiner Lee explained that the platinum nitride-based nano-material only means that the material includes platinum and nitride, and the language does not require the material to contain platinum nitride. No agreement was reached as to the proper interpretation of this term.

Claims 1, 3-7 and 20-33 are rejected under 35 U.S.C. §103(a) over Yamauchi in view of Tsumura.

The cited prior art does not disclose or suggest the claimed catalyst material, membrane electrode assembly or fuel cell. To begin, Yamauchi fails to disclose a "platinum nitride-based nano-material" as described below. Yamauchi discloses the following process in paragraph [0006] (using the translation).

heating the solid solution in an atmosphere of the vapor phase element Z at a potential at which a compound of the metal element X and the metal element Y is produced, the potential being insufficient to produce a compound of the metal element Y and the vapor phase element Z

In Yamauchi, the vapor phase element Z reacts not with the metal element Y but with the metal element X as will be apparent from the descriptions in paragraphs [0006] and [0007]. Platinum is not the metal element X but the metal element Y, as is apparent from the descriptions in paragraphs [0009], [0011] and [0012]. Thus, Yamauchi does not disclose a compound of the vapor phase element Z with the metal element Y. There is no platinum nitride material formed using the method of Yamauchi. Adding the teachings of Tsumura of smaller particle size does not change the fact that a platinum nitride material is not produced by the method of Yamauchi.

As discussed above, the Office Action seems to interpret "platinum nitride-based nano-material" to be any material which includes platinum and nitride. To be more specific,

"platinum nitride-based nano-material" is not restricted to a material containing platinum nitride.

The Applicant respectfully submits that such an interpretation is inappropriate. A nano-material including platinum and nitride should be expressed by "a platinum and nitride-based nano-material". Further, it is clear that "metal nitride" means a compound of the metal with nitrogen. Therefore, a "platinum nitride-based nano-material" should be interpreted as a nano-material including platinum nitride.

Yamauchi fails to disclose a "platinum nitride-based nano-material," and Tsumura does not cure the deficiencies. Therefore, the rejections under 35 U.S.C. §103(a) should be withdrawn for this reason alone.

Secondly, the Office Action states, on page 2, line 21 to page 3, line 3:

Yamauchi discloses a catalyst material comprising chemical compounds X, Y, and Z. X (applicant's T) comprises Ti, Zr, Al, Fe, Cr, Mo, V, and Si. Y (applicant's A) comprises Pt, Ag, Au, Cu, Ni, Pd, Co, Cr, Mo, W, Ti, Zr. The metallic elements are treated with a gaseous phase of ammonia (NH₃) at an elevated temperature [0012]. Yamauchi discloses embodiments in which the elevated temperature ranges includes from ~500C to ~1500C. See Examples 1-3.

The Office Action also states on page 3, lines 14 to 18:

Example 5 [0027, 0028] discloses a Cu-Al solution that was held at 800 C in NH₃ atmosphere in 1 atm for 2 hours. It resulted in fine particles that are homogeneously dispersed, in which includes AlN dispersed in Cu matrix. Likewise, it would have been obvious to one of ordinary skilled in the art at the time the invention was made to mix any one of X and Y compounds under the same experimental conditions as Example 5.

The Office Action further states on page 3, lines 19 to 21:

The Examiner notes that in the instant Specification pg. 15 lines 14-17 that nitriding is performed at a temperature of 200 C to 1000 C for 0.05 to 100 hours in a gas atmosphere containing NH₃ with a partial pressure of 0.05 atmospheres or more.

Lastly, the Office Action states on page 4, lines 1 to 3:

Yamauchi must necessarily possess platinum-containing nitride particles because particles of Yamauchi are prepared by the method of the claims as supported in the Specification.

In short, the Office Action draws the conclusion that when the materials described on page 2, line 21 to page 3, line 1 and the temperature and pressure conditions described on page 3, lines 2 to 3 of the Office Action are applied to the method described in Example 5 of Yamauchi, such a method satisfies the conditions described in the present specification and thus can produce platinum-containing nitride particles.

However, in the disclosure of Yamauchi, Example 5 is provided as an example in which nitrogen is the vapor phase element Z, while Examples 1-3 are provided as examples in which oxygen is the vapor phase element Z. As will be apparent from the descriptions in paragraphs [0007] and [0015] and FIGS. 1 and 2, in Yamauchi, the temperature and the partial pressure of vapor phase element Z should be determined according to the combination of vapor phase element Z and metal elements X and Y. Therefore, there is no reason to apply the above-described temperature and pressure conditions in examples 1-3 to the method disclosed in Example 5 of Yamauchi. Accordingly, it is respectfully submitted that the following statement in the Office Action on page 4, lines 1-3 is erroneous:

Yamauchi must necessarily possess platinum-containing nitride particles because particles of Yamauchi are prepared by the method of the claims as supported in the Specification.

For this additional reason, the rejections under 35 U.S.C. §103(a) should be withdrawn.

A third reason to with the outstanding rejection will be described. The average diameter range specified in each pending claim of the present application is determined in consideration of the introduction of nitrogen. To be more specific, when platinum or platinum alloy particles as a raw material of the catalyst particles are relatively large, nitrogen

cannot be introduced at a relatively high concentration. By contrast, when the platinum or platinum alloy particles are so small that the catalyst particles have an average diameter as stated in each independent claim of the present application, nitrogen can be introduced at a relatively high concentration.

Tsumura discloses that an activity of an electrode which includes carbon loaded with a platinum-group metal as catalytic metal depends on the specific surface area of the catalytic metal. However, Tsumura does not disclose or suggest that downsizing platinum or platinum alloy particles makes it possible to introduce nitrogen at a relatively high concentration. Even if were possible to downsize the catalyst particles of Yamauchi to the range as stated in each independent claim of the present application, such downsizing yields effects which are not predictable by a person having ordinary skill in the art. Moreover, neither Yamauchi nor Tsumura provides any teaching to this effect.

For this third reason, the rejection under 35 U.S.C. §103(a) should be withdrawn.

It is respectfully submitted that the present application is in condition for allowance, and a favorable action to that effect is respectfully requested.

Respectfully submitted,

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